POLICY RESEARCH WORKING PAPER 3087

Gender, Generations, and Nonfarm Participation

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The World Bank
Development Research Group
Rural Development
June 2003

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Abstract

Emran, Otsuka, and Shilpi present an empirical analysis of intergenerational links in nonfarm participation with a focus on gender effects. Using survey data from Nepal, the evidence shows that the mother exerts a strong influence on a daughter's employment choice. Having a mother in a nonfarm sector raises a daughter's probability of nonfarm participation by 200 percent. The effects are truly dramatic for skilled nonfarm jobs. Having a mother in a skilled job raises a daughter's probability by 1,200 percent. Having a father in a nonfarm sector, on the other hand, does not have any significant effect on a son's probability of nonfarm participation when the endogeneity of education and assets is corrected for by the two-stage conditional maximum likelihood approach. But a moderate positive intergenerational correlation between fathers and sons exists for skilled jobs.

This paper—a product of Rural Development, Development Research Group—is part of a larger effort in the group to understand the process of development of the rural nonfarm sector. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Pauline Kokila, room MC3-604, telephone 202-473-3716, fax 202-522-1151, email address pkokila@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at semran@gwu.edu, motsuka@jhu.edu, or fshilpi@worldbank.org. June 2003. (33 pages)

Gender, Generations, and Non-farm Participation

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Key Words: Intergenerational Correlations, Occupational Mobility, Non-Farm Participation. Gender effect, Two Stage Conditional Maximum Likelihood

JEL Classification :J62, O12

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Introduction

The evolution of income distribution, inequality and occupational structure across generations has attracted increasing attention in recent economic literature. This renewed interest reflects a widely shared consensus that the existence of intergenerational linkages in socioeconomic status has profound implications for mobility (or immobility) in a society. Starting from identical initial income distribution or occupational structure, the evolution of two societies might diverge dramatically if the strength of intergenerational linkages differs significantly.[1] A large body of empirical studies focusing mainly on developed countries finds that intergenerational correlations in earnings are positive, statistically significant and numerically large, ranging between 0.2 to 0.5 (for a survey, see Solon (1999)).[2] There is also a (relatively) small empirical literature that indicates significant positive correlations between parents and their offspring in occupational choices (see Dunn and Holtz-Eakin (2000) on U.S, Sjogren (2000) on Sweden, and Chevalier (2001) on UK). In this paper, we focus on intergenerational correlations in non-farm employment in a developing country, Nepal, with a particular emphasis on the gender dimension of these correlations.[3] Although there is a substantial literature on the determinants of non-farm participation (see Lanjouw and Feder (2001) for a survey), the issue of intergenerational linkages has so far not received any attention. A vast literature also explores gender effects in intra-household allocation of resources in developing countries (Kanbur and Haddad, 1994; Haddinott and Haddad, 1995, Thomas, 1997; Quisumbing and Maluccio, 1999). However, to our knowledge, the gender effects in intergenerational linkages in non-farm participation have not been analyzed before.

Although so far neglected in the literature, the analysis of intergenerational linkages and gender effects in non-farm participation has important implications that span a number of policy areas.

[1] At one extreme, the socioeconomic opportunities available to an individual in a society might be effectively determined by birth as in a caste system. At the other extreme is a perfectly mobile society, in which the set of opportunities is same irrespective of the exogenous characteristics of an individual, like birth, gender, ethnicity. It is often argued that mobility is much more restricted in developing countries (see, for example, Lam and Schoeni, 1993).

[2] As indicated in Solon (1999), most of the papers on intergenerational income correlations focused on the interlink between father and sons. Chadwick and Solon (2002) is one of the few exceptions looking at these correlations between mothers and daughters.

[3] There are a couple of advantages in focusing on occupational correlation instead of income correlation. First, it is not fraught with the almost insurmountable measurement problems in permanent income, the variable of interest in income mobility studies. Second, as Goldberger (1989) pointed out early on, intergenerational linkages might be stronger for occupation choice (relative to income), and focusing on income correlations "could lead an economist to understate the influence of family background on inequality" (P.513).

The available evidence shows that poverty in developing countries has a gender dimension; women are among the poorest and chronically deprived segment of the population (World Bank, 2001). At the early stages of development, access to non-farm employment can be a way out for the poor and landless people in general, and women in particular, as has been demonstrated by the micro finance programs like Grameen Bank in Bangladesh. A related but more important point is that the bargaining power of a woman is likely to be positively influenced by her participation in non-farm sector since much of women's work in agriculture remain unpaid. Access to non-farm employment bears special significance as a way to ensure control over income by women, which in turn has desirable effects on the intra-household allocations.[4] Notwithstanding the benefits of non-farm participation by women, there is a strong gender bias against women in non-farm participation in many developing countries (for instance, in our Nepal data set, the participation rates in the non-farm sector are 45 percent for men and 22 percent for women).[5] It is important, especially from a policy perspective, to understand how much of this gender bias is due to occupational immobility caused by gender-specific intergenerational linkages. If there are strong intergenerational linkages in women's non-farm participation as the evidence discussed later suggests to be the case in Nepal, this implies that the long run benefits from women's participation in non-farm sector are likely to be much higher due to the intergenerational multiplier effect. Thus the standard cost-benefit analysis that ignores this multiplier effect is likely to underestimate the value of programs that simultaneously target poor women and encourage their participation in non-farm activities. [6]

Our focus in this paper is on the more 'intangible' determinants of intergenerational linkages

[4] A large number of empirical studies in the context of developing countries finds that greater resource control by women within the household leads to higher expenditure on family welfare (e.g. on food), especially higher expenditure on children (education, health etc.) and woman herself (for a recent survey, see World Bank, 2001).

[5] For similar evidence from India and Malaysia, see Feder and Lanjouw (2001). It should be noted that while this pattern holds in many African countries as well, in Latin American countries, participation rates in the non-farm sector are significantly higher for women compared with men.

[6] A different argument that underscores the importance of understanding the intergenerational linkages in non-farm participation relates to the role of non-farm entrepreneurship in the structural transformation of an economy. A dynamic non-farm sector can be the seedbed for experimentation and development of an entrepreneurial class that eventually graduates to industrial activities, as was the case in Japan's rise to a modern industrial state from late Tokugawa to Meiji period (See Smith, 1988). The existence of strong intergenerational linkages in non-farm participation means that the initial conditions assume paramount importance, and the emergence and development of an industrial entrepreneurial class might be severely constrained when an economy starts with a tiny non-farm sector and a large agricultural sector.

in non-farm participation like role model effects, learning externalities, and transfer of reputation capital. We explicitly control for education, assets, and network variables in the regressions, and the parental occupation variables thus capture the 'intergenerational linkages' over and above these more tangible (relatively easily measurable) factors. To separate out the effects of parents as role models, and of learning externalities and transfer of reputation capital, we also need to control for genetic ability transmission which is presumably an important intangible factor in any type of intergenerational link. While it is very difficult, if not impossible, to find reasonably good controls for ability, we use parental and spousal education to control for ability correlations. The inclusion of spousal education is predicated on the large empirical literature on assortative matching in marriage market.[7] The econometric results, using household level survey data from Nepal, indicate strong intergenerational linkages in non-farm participation running along gender lines (mother-daughter, father-son) if , following the extant literature, we ignore the simultaneity between education and occupation decisions. The intergenerational correlations are pretty robust with respect to the inclusion of an array of control variables. However, the evidence unambiguously rejects the null hypothesis of exogeneity, both for education and assets, in the non-farm participation decisions of sons. The estimated intergenerational occupational linkages become numerically small and statistically insignificant for sons when endogeneity of education and assets is corrected by utilizing the Two-Stage Conditional Maximum Likelihood (henceforth TSCMLE) approach (Blundell and Smith, 1986; Rivers and Voung, 1988). When disaggregated according to skill levels, there are evidence of a positive correlation between father and son(s) only in the case of skilled jobs, thus indicating that the aggregate results are partly driven by the lack of intergenerational correlations in unskilled jobs. For daughters, there is convincing evidence that the endogeneity problems are not important, and that there are strong effects of parents', in particular mother's, non-farm participation regardless of levels of skill. Having a mother in the non-farm sector raises a daughter's probability of non-farm participation by 200 percent when the sample consists of both skilled and unskilled groups. The effects are truly dramatic in the case of skilled jobs; a daughter's probability of being in skilled job increases by 1200 percent if her mother

[7]We do not have any data on cognitive tests, like Raven's test. However, it is not clear to what extent the results of a very rudimentary test like Raven's can capture the type of ability correlations relevant for occupational choice.

is employed in skilled job. The cross gender intergenerational links (mother-son, father-daughter) in non-farm participation appear to be unimportant.

The remainder of the paper is organized as follows. Section II provides a conceptual framework that underpins the empirical work presented in the subsequent sections. It presents a systematic analysis of possible sources of intergenerational linkages and gender effects in employment and occupational choice. The Section III describes the empirical specification, while the next section discusses the data and construction of variables. Section V, arranged in a number of sub-sections, presents the empirical results. The first sub-section discusses the preliminary evidence and thus provides a first impression of the importance of the intergenerational dependence in the non-farm participation. The next subsection presents the results of the empirical analysis that takes into account the potential endogeneity problems. The following sub-section focuses on the role of skill differences in non-farm jobs. Section VI concludes the paper with a summary of the main findings.

II. The Conceptual Framework

To discuss the many different channels of intergenerational linkages in a coherent conceptual framework, we use a simple model of non-farm participation that is based on the standard occupational choice model but is augmented to capture the essentials of the intergenerational linkages.[8]

There are two sectors in the economy: agriculture (a) and non-farm sector (n). There are overlapping generations of people, each with a life span of two periods; in the first period (t_0) they live with the parents, and build up human capital (schooling and/or in-house learning externalities), and at the beginning of the second period (t_1) every person in the economy decides which sector to work for. Each individual is endowed with an innate ability $\theta_i \in [0, 1]$ that captures the genetic transmissions and idiosyncratic talents that are relevant for non-farm sector. So the higher is θ_i the better suited an individual is for non-farm employment. The intergenerational linkages may arise from the fact that the genetic endowments of a child (θ_i) are likely to be correlated with those of parents. The other major sources of intergenerational occupational correlations include

[8]The model utilized here can be viewed as an extension of the celebrated contributions of Becker and Tome (1979 and 1986) and the recent extensions proposed in Sjogren (2000).

learning externalities (learning by watching ones parents and learning by doing through informal apprenticeship), role model effects (both through induced preference change and revelation of information about the unknown innate ability parameter θ_i), relaxation of credit constraints through financial transfer, inheritance of reputation capital and better access to a given occupation due to the network created and cultivated by the parents working in the same occupation (For a more complete discussion see Becker and Tomes (1979, 1986), Mulligan (1997), Lentz and Laband (1983)).

The optimization problem faced by an individual i of generation 0 at the beginning of first period (t_0) is to choose an optimal level of education (e_i) given the information set Ω_i^0 summarizing all relevant information including the estimated innate ability, parental occupation (d_i^p),[9] and costs of education or acquired ability $K_i(e_i, d_i^p)$.[10] A higher education level increases the probability of getting a better paid non-farm job in the next period. At the beginning of second period (t_1), he/she takes the education level e_i^* as given, and solves the optimal occupation choice problem utilizing the relevant information set Ω_i^1. Note that due to information revelation in the first period,[11] the information set at the beginning of the occupational choice is richer, implying $\Omega_i^0 \subset \Omega_i^1$.

The optimal Schooling Decision:

Let the possible education level $e_i \in [0, \bar{S}]$, $\forall i$ where $\bar{S}$ is maximum number of years of schooling possible. Each level of education induces a conditional distribution of income Y_i that incorporates the optimal choice of occupation in the following period given the information set Ω_i^0. Let $F(Y_i^1 \mid e_i; \Omega_i^0)$ be the conditional distribution of second period income when individual i chooses education level e_i given the information set Ω_i^0. The associated probability density function is denoted as $P(Y_i^1 \mid e_i; \Omega_i^0)$. The optimal schooling choice is as follows:

$$e_i^* = \arg\max_{e_i} \left\{ U_i(Y_i^{0p} - K_i(e_i, d_i^p)) + \delta_i \int U_i(Y_i^1) P\left(Y_i^1 \mid e_i; \Omega_i^0\right) dY_i^1 \right\} \tag{1}$$

[9] We denote the parental variables with the superscript p.

[10] The cost of acquired ability depends on parental occupation due to in-house learning externalities.

[11] There are many types of information revelation that might occur during the first period, like sucess/failure in formal education might reveal information about ones innate ability θ_i, parental network might expand or contract etc.

where Y_i^{0p} is the first period income transfer from the parents and δ_i is the discount factor, and $U_i(.)$ is a concave utility function.[12] Among other things, the optimal schooling decision highlights the importance of first period parental transfer as a way of relaxing the credit constraint for educational investment which is important for non-farm jobs. Since the non-farm income is usually higher than that from agriculture, the financing of children's education gives rise to intergenerational linkages in non-farm participation if children's education is not an inferior good for the parents.

The above model of human capital choice is built on the assumption that the value of education derives from the stream of higher earnings it implies in the future labor market. However, there is a substantial empirical literature in the context of developing countries which demonstrates that, for girls, education is geared more to the marriage market considerations rather than labor market opportunities (see, for example, Behrman et. al., 1999 on India). If this is also the case in Nepal, then education is not likely to be endogenous in the occupational choice of daughters.

The Optimal Occupational Choice

At the beginning of second period, individual i takes the accumulation of human capital and the consequent estimate of ability as given, and optimally chooses the occupation $d_i \in \{a, n.$ Now given the information set Ω_i^1, a choice of occupation induces a probability distribution of income. Let $F(Y_i^1 \mid a; \Omega_i^1)$ denote the conditional distribution of income when individual chooses agriculture and the information set is Ω_i^1 with the associated probability density function $P(Y_i^1 \mid a; \Omega_i^1)$.

We define the expected utility from choosing agriculture as:

$$V_i(a, \Omega_i^1) \equiv \int U_i(Y_i^1) P(Y_i^1 \mid a; \Omega_i^1) dY_i^1 \tag{2}$$

Analogously the expected utility from choosing non-farm sector is:

$$V_i(n, \Omega_i^1) \equiv \int U_i(Y_i^1) P(Y_i^1 \mid n; \Omega_i^1) dY_i^1 \tag{3}$$

[12]Genetic preference correlations means that, on an average, the children of parents who are risk takers may themselves be more inclined to take risk and thus become non-farm entrepreneurs.

The individual chooses non-farm employment iff the following holds:[13]

$$V_i(n, \Omega_i^1) - V_i(a, \Omega_i^1) \geq 0 \tag{4}$$

The probability that an arbitrary individual drawn from the population will decide to work in the non-farm sector is $\Pr(V_i(n, \Omega_i^1) - V_i(a, \Omega_i^1) \geq 0)$. At the heart of the occupation selection process is the formation of expectation about pay-offs from different options using the information set Ω_i^1. A critical element of the information set is the occupational choices of the parents. The parental occupation reveals two types of relevant information: (i) information about ones own genetic endowment (or innate ability), (ii) information about the characteristics of a certain occupation. For example, if parents (either or both) are successful (unsuccessful) non-farm entrepreneurs, the estimate of children's ability to be successful in similar occupation will be revised upward (downward). Another important channel is that revelation of information might reduce the uncertainty about the parental occupation, and thus induce risk-averse children to prefer the parental occupation to other alternatives. Thus, the information revealed by parental choices (and their outcomes) can influence children's occupation decision through their effects on the conditional distribution function of income Y_i^1 giving rise to role model effects (Manski 1993; Streufert, 2000).[14] For example, consider a child's participation decision in non-farm sector. The parental role model effects due to information revelation imply that the conditional distribution of income when parents are in non-farm $F(Y_i^1 \mid n;\, n^p, \Omega_i^1)$ is stochastically dominant (first or second order) over the conditional distribution of income with neither of the parents is in non-farm $F(Y_i^1 \mid n;\, a^p, \Omega_i^1)$. [15] Similar effects on the conditional distribution of income can also be due to learning and network externalities and financial and reputation capital transfers from parents who work in the better paid non-farm jobs. On the other hand, the role model effects *a la* Durlauf that mould the preferences of children are captured in the utility function.

The model presented above identifies a number of different sources of intergenerational link-

[13] Assuming that the tie is broken in favor of non-farm sector.

[14] The definition of role model adopted so far in economic literature is not uniform. For example, while Durlauf (2000) defines role model as the influence of "characteristics of older members" on the "preferences of younger members", Manski (1993) and Streufert (2000) define it as observations on older members whose choices reveal information relevant for the choice of younger members.

[15] Again, the superscript p denotes a parental variable. For example, a^p implies that the parents work in agriculture. Similarly, superscripts m and f denote mother and father respectively.

ages, but it leaves unexplored the sources of any gender effects in intergenerational linkages in employment and occupational choice. Why would one expect the correlations to be stronger along gender lines (mother-daughter and father-son)? Since the transfer of financial and reputation capital, and network effects can be reasonably argued to be largely gender neutral, we need to look for the answers in the other sources of intergenerational linkages discussed above. First, the genetic transmissions might have a gender dimension. For example, the preference of a daughter (son) is likely to be more aligned with that of her (his) mother (father) compared to that of her (his) father (mother). Second, and probably the most important factor behind gender effects in intergenerational linkages in occupational choices, is the gender dimension in role model effects. The information revealed by the choices (and consequent outcomes) of an older member of a society will be more informative for the choices of a given younger member the closer he/she is to the younger person in an appropriately defined socioeconomic space. The individuals can be grouped together by partitioning the socioeconomic space according to different exogenous (like ethnicity, gender) or endogenous (like schooling) characteristics. The finer the partitioning the more informative is the information revealed by the choices of a member of a given group for the other members of that same group. It immediately follows that, given the membership in a family, gender creates a finer partitioning, and the mother becomes the natural role model for the daughter, and the father for the son. This has also implications for learning by doing and observing as the daughter (son) 'sees' and 'hears' primarily what her (his) mother (father) does and says.

III. The Empirical Specification

For the econometric estimation, we employ a standard probit model taking inequality (4) as the basis for our empirical specification. Specifically, we consider the binary response model

$$y_i = \begin{cases} 1 & \text{if } \left(y_i^* \equiv V_i(n, \Omega_i^1) - V_i(a, \Omega_i^1) \geq 0\right) \\ 0 & \text{otherwise} \end{cases} \tag{5}$$

For estimation we impose linearity and assume that the latent variable y_i^* is generated from a model of the form

$$y_i^* = \overset{\frown}{X}_i \beta + \varepsilon_i \tag{6}$$

Where $\overset{\frown}{X}_i \subseteq \Omega_i^1$ is a vector of explanatory variables and ε_i is the idiosyncratic random disturbance term. For convenience, we partition $\overset{\frown}{X}_i$ into four subsets: (i) X_i , the elements of which are individual specific characteristics (like education e_i^*, age, gender and marital status) that influence the productivity and preference, (ii) X_i^p, a vector of parental characteristics (mainly parent's occupation (d_i^p) and parental education), (iii) X_i^h, a vector of household characteristics (household size and composition, spousal education), and household's asset ownership that includes any transfers of financial capital from the parents, and (iv) X_i^g, a vector representing network variables like ethnicity, and measures of non-farm opportunities available in a village. When we explicitly control for education and assets along with controls for intergenerational ability correlations (parental and spousal education), the parental occupation variable (s) then captures any intergenerational correlation resulting from similarities of preferences, transfer of intangible human and other types of capital (learning- by- watching, reputation capital etc.) and role model effects due to induced preference changes and information revelation.

There are two salient econometric issues that need to be dealt with in order to identify the effect of parent's occupation on children's occupational choices. First and perhaps the most important concern is that the intergenerational correlation in occupation may result, *spuriously*, from the fact that parents and children may face similar labor market opportunities. For instance, if both parents and children live in an area with better non-farm opportunities, then intergenerational correlation in non-farm participation may be an artifact of not adequately controlling for non-farm opportunities in the regression. We use village level fixed effects in the estimation to control for non-farm opportunities.[16] Second, according to the theoretical model, investment in education in first period is dependent on the expected occupation in the second period, and thus is endogenous

[16]Since non-farm opportunities are often clustered around urban areas, one can use distance to nearest urban center (or a non-linear function of it) as a control for unobserved heterogeneity in non-farm opportunities. Other candidate variables include the observed level of employment diversification and average income in a village. However, even with a wide range of village level controls, there could still be unobserved heterogeneity across villages in terms of non-farm employment opportunities.

in the non-farm participation decision.[17] Moreover, current assets of the household are also likely to be endogenous to the occupations of the household members. To deal with the endogeneity problem, we employ the Two-Stage Conditional Maximum Likelihood (TSCMLE) approach.

IV. The Data

The data for our analysis come from the Nepal Living Standard Survey (NLSS) 1995/96. The NLSS consists of a nationally representative sample of 274 primary sampling unit (PSUs) selected with probability proportionate to population size, covering 73 of the 75 districts in Nepal. In each of the PSUs, 12 households were also selected randomly (16 households in the Mountain regions) providing a total sample size of 3373 households. With an average household size of about 5.6, the survey collected detail information for 18855 individuals. The NLSS is unique in the sense that it contained an entire section of questionnaire on parental information, including level of education, sector of employment and place of birth. The survey contains detail information on employment by sectors and by occupations at individual levels. However, for those parents who do not live in the household, or who are deceased, only four types of employment status were recorded; whether they were employed as wage labor in agriculture or non-agriculture, or self employed either in agriculture or non-agriculture. Hence the sample does not allow finer analysis of occupational followings among children. As an individual is allowed to record more than one types of employment at the same time, the employment status data can be taken as if indicating whether the person was ever employed in non-farm sector. However, data on time spent on different activities are not available, precluding any attempt to distinguish between primary and secondary occupations. As regression analysis reported in the subsequent section indicate, the basic results on intergenerational correlations in occupation remain unchanged whether we focus on the sample that includes observations reporting multiple occupations or on the sample which focuses only on those reporting a single occupation.

Of the total individual level sample of 18347 for whom parents can be identified from the data, nearly 71 percent reported participation in the labor force, but about 20 percent did not report

[17]Observe that even though the education level is predetermined when the occupational choice is made, it can not be treated as exogenous, assuming that the value of education derives from future labor market. Of course, as discussed earlier, in case of girls, the endogeneity might not be important if the value of education derives from assortative matching in marriage market.

any occupation.[18] For the rest of the sample (9417 observations), 10 percent are either child labor (less than 14 years of age, 9 percent) or too old (more than 70 years of age) and thus are dropped.[19] But some of the parents of these individuals did not either participate in the labor force or report their labor force participation, further reducing the size of the sample.[20] Moreover, a number of the PSUs showed no employment diversification which are dropped to avoid perfect fits in the regression analysis. Splitting the sample between males and females, we end up with a final sample of 2090 observations (in 152 PSUs) for daughters and 2948 observations (in 242 PSUs) for sons.

The NLSS 1995/96 also contains a wide range of variables on household structure, education, income and asset ownership which can be used as controls in the regression. They include household size, composition of household (share of female adults, share of children, share of young and share of old in total household size) as well as individual's marital status and gender. The human capital of an individual is measured by her/his level of education and age.[21] The education variable codes different levels of education (e.g. 0 if illiterate, 1 if literate but no schooling, and so on). We also define a set of dummies (15 to be exact) depicting the ethnicity of the individual. Finally, we use two alternative representations of the most critical variable in our analysis: parental occupation. First, we define a dummy indicating if at least one of the parents was employed in non-agriculture (n^e). Second, to allow for differential impacts, we disaggregate and define three different dummy variables: (i) whether both parents are employed in non-agriculture (n^p), (ii) if only father was employed in non-agriculture (n^f) and (iii) if only mother was employed in non-agriculture (n^m). The summary statistics of the explanatory variables are presented in appendix Table A.1.

[18] A large fraction of those not reporting occupation are in fact child labor with age 14 years or less.

[19] Note that the empirical results reported in the following sections remain unchanged even if we use any other cut-off age (e.g. dropping those below 20 years of age and above 65 years of age and so on).

[20] For 8394 individuals left in the sample, both parents reported participation in the labor force in the case of 6874 individuals, and for rest of the observations, employment status of either father (347 observations) or mother (1173) are missing. Note that if we use dummies to capture the missing parental information, the sample size can be increased but the qualitative results remain unaffected.

[21] In addition to human capital, age captures any cohort effect also.

V. Empirical Results

V.i Preliminary Results

To gain a feel for our data, simple statistics on employment status of daughters and sons are presented in Table 1. Overall, men have a higher probability of being employed in non-farm (45 percent) compared with women (22 percent). Comparison of sons and daughters' employment status conditional on father's and mother's employment status reveals that probability of being employed in the non-farm sector is markedly higher for both sons and daughters if father or mother were employed in non-agriculture as well. However, mother's participation in non-farm sector appears to have a larger effect, compared with father's non-farm participation, on both sons' and daughters' probability of participation in non-farm sector. Moreover, mothers seem to exert greater influence on daughters; daughter's probability of non-farm participation nearly doubles (from 33 to 59 percent) if mother was employed in the non-farm sector compared with the case where father was employed in the non-farm sector. In the case of sons, the effect is less dramatic as probability of participation increases from 59 to 68 percent.

[See Table 1]

With some indication of positive intergenerational correlations between parents' and children's employment status, we turn to see if the results survive in regression analysis. Starting from a simple bivariate regression of sons' and daughters' occupations on parental occupations, we take a stepwise approach in presenting the results, introducing an array of control variables in subsequent steps. This helps to demonstrate the robustness (or non-robustness) of intergenerational linkages in non-farm participation. The results from daughters' sample are reported in the first panel (column 1a to 3b) of Table 2, and for sons' in the second panel (from column 4a-6b). The result from the simple bivariate regression in column 1a shows that parents' non-farm participation has significant positive influence on daughter's probability of participation in the same sector. Switching the indicator variable for either parent in non-farm employment from zero to one raises the probability of daughter's employment in non-farm sector from 0.15 to 0.26. This suggests a marginal effect[22] of about 0.11 which is quite large compared to daughter's average probability

[22]The marginal effect is estimated by holding all other explanatory variables at their sample mean values while switching the relevant indicator variable from zero to one.

of participation in non-agriculture of 0.22. The results for the sons' sample (column 4a) indicate equally significant and positive intergenerational effect. Switching the indicator variable for either parent in non-farm employment from zero to one raises sons' probability of participation in non-farm sector by 0.15 compared with sample average probability of 0.45.

[See Table 2]

Columns 1b and 4b of Table 2 report the regression results for daughters and sons respectively in the case when the indicator variable depicting parental employment status is decomposed into three different indicator variables to allow for differential impact of father's and mother's employment status. The results reveal some interesting differences in the intergenerational effects between sons and daughters. For sons, results presented in column 4b of Table 2 suggest that having both parents in non-agriculture (n^b) has the strongest effect with an estimate of marginal effect of 0.25 at sample mean value. Having only father in non-farm sector (n^f) also has statistically significant (p-value=0.00) and positive marginal effect (0.12) on son's employment choice. But only mother in non-farm sector (n^m) appears to exert no significant influence on son's non-farm participation (t-statistic=0.48). These results stand in sharp contrast with results from the daughter's sample. For daughters, having only mother in non-farm sector (n^m) has the strongest effect; switching the indicator variable n^m from zero to one raises daughter's probability of non-farm participation by 0.39 which is slightly larger than the marginal effect (0.36) of having both parents in non-agriculture. In comparison, having only father in non-farm sector has no statistically significant effect on daughter's employment choice (t-statistic=-0.43). These results (in columns 1b and 4b) suggest that intergenerational linkages may run along gender lines with mother (father) having stronger influence on daughters (sons) and vice versa.

Regressions 1a-1b and 4a-4b attribute variations in daughters' and sons' employment choice entirely to parent's employment choice. The estimated positive correlations may not necessarily represent any genuine intergenerational externality but may simply pick up effects of omitted factors such as non-farm opportunities that influence both parents' and children's employment decisions in the same direction. The regression results using village level fixed effects to control for heterogeneity in non-farm opportunities are summarized in columns 2a-2b (for daughters) and

5a-5b (for sons).[23] The inclusion of village level dummies leads to a significant reduction in the magnitude and statistical significance of the estimated coefficients and marginal effects of parents' occupational status on son's choice of occupation. However, the effects of either parents (n^p) (in column 5a) and of both parents (n^b) (in column 5b) employed in non-farm sector are still positive and statistically significant. The results for the daughters are again quite different from that for the sons. While there is a slight decline in the magnitude of the estimated coefficients and their respective statistical significance, the overall results on intergenerational correlations remain nearly unchanged. The effect of only mother's employment in non-agriculture sector (n^m) is still the strongest with a marginal effect of 0.36 followed by both parents employed in non-agriculture (n^b) (0.30). As before, having only father in non-farm sector does not have any significant effect on daughter's employment choice. The slight changes in daughter's results compared with the drastic weakening of the intergenerational correlations for sons when village level fixed effects are introduced in the regression appear to be puzzling at first sight. However, it is not entirely unexpected in a traditional society such as Nepal where married women leave their natal family to join the household of the spouse, and hence face labor market opportunities different from their own parents. In most cases, sons, on the other hand, tend to live in the same village as their parents, if not in the same dwelling.[24]

The next set of results reported in columns 3a- 3b and 6a-6b of Table 2 include a large number of household and individual level variables in addition to parental employment status and village dummies as explanatory variables. Access to non-farm jobs frequently depends on personal networks that often run along ethnic group/caste (see, for example, Dreze, Lanjouw and Sharma, 1998). To capture the variation in access to non-farm jobs, we include a set of dummies depicting the ethnicity of the individual in the regression. We also include dummies showing if there is any short/long-term migrant in the household, as migration frequently occurs on the basis of personal networks. A set of household variables including household size and composition are also added to

[23]If we use travel time to nearest urban center, village level median per capita expenditure, and share of non-farm employment in total village level employment as proxies for non-farm opportunities, the regressions results imply larger and more significant positive impact of parental variables compared with those obtained from regressions with village level fixed effects.

[24]Although the tendency to migrate to urban areas is relatively higher among men, the incidence of permanent migration is not significant. In our current sample about 3.5 percent of all households reported any permanent migration from rural to urban areas.

the set of explanatory variables. As discussed in the theoretical model, human and financial capital variables are important links in the intergenerational transmissions of socioeconomic status. To isolate the effects of other 'intangible' factors that include the genetic transmissions through endowment and preference and the role model effects, we introduce human and financial capital variables to control for the 'tangible' source of intergenerational correlations. In addition to the level of education e_i^*, we include age of an individual as a human capital variable representing the work experience.[25] Total asset owned by the household is also introduced as a regressor to control for access to capital. Transfer income (remittances) received by the household and travel time to nearest commercial bank are also included as additional controls for access to capital. We include individual's marital status to account for taste and/or gender related differences.

In Table 2, columns 3a -3b and 6a-6b present the results for the daughters' and sons' samples respectively ignoring the existence of potential endogeneity of human capital and assets.[26] While individual, household level and network variables have statistically significant effects on both son's and daughter's probability of non-farm participation, the results on intergenerational correlations in occupation improve slightly for sons and remains nearly unchanged for daughters. For instance, having either parent in the non-farm sector raises son's probability of non-farm participation by 0.09 which is slightly higher than the marginal effect [0.07] reported in column 5a of Table 2. The inclusion of a large number of variables as additional controls does not affect the strength of parental influence on son's and daughter's non-farm participation significantly. This suggests that parent's occupation choice variables did not act as proxies for individual's human capital or access to financial capital or household and network variables.

[See Table 3]

[25] In addition, age and its squared term will capture any cohort effect also.

[26] If parental occupation dummies were excluded from these regressions, 3a-3b and 6a-6b (Table 2) would correspond directly to the standard specification used in the available literature (Ferrira and Lanjouw, 2001; Lanjouw, 2001, Lanjouw and Shariff, 2000). Consistent with the findings of these studies, we find that an individual's probability of non-farm participation varies significantly and positively with the level of education (marginal effect equal to 0.07 and p-value=0.0 for daughters and to 0.03 with p-value=0.03 for sons). Apart from the ethnicity dummies, having a migrant in the household also significantly improves son's but not daughter's probability of participation in the non-farm sector suggesting strong network effects in securing a non-farm job for men. On the other hand, participation in non-farm sector varies negatively with household size in the case of daughters but has no significant relationship with household size for sons. Participation in non-farm sector varies negatively with ownership of assets (mainly agricultural land) implying some occupational following in agriculture. Ethnicity dummies are jointly significant for both sons and daughters. Most of the other variables have expected signs and impacts on non-farm participation.

The results so far indicate that observed intergenerational correlations between parents and children are not due to 'tangible' intergenerational linkages, as the tangible sources like individual's education and asset transfers from parents are already controlled for in the regression. Among many 'intangible' sources of these correlations, perhaps most common is the correlation in ability of parents and children due to genetic transmission. While it is difficult to get indicators that measures ability reasonably well, we introduce father's and mother's education to control for ability correlations. As evidence from marriage market suggest prevalence of assortative matching (Boulier and Rosenzweig, 1984), we also include spouse's education as an additional control for ability. For un-married individuals, household head's education is used in the place of spouse's education. The regression results are presented in column 1a-1b (daughters) and 3a-3b (sons) of Table 3. Among the variables representing ability (not reported in Table 3), spouse's education has positive and statistically significant (p-value= 0.05) impact on daughter's non-farm participation.[27] In contrast, the level of mother's education influences son's non-farm participation positively and significantly (p-value=0.03). However, inclusion of the variables representing ability leaves the results on intergenerational correlations unaffected as obvious from the results reported in Table 3. The results on the strength of the intergenerational correlations in occupation choice appear to be robust to inclusion of a large number of explanatory variables, and do not seem to spring from tangible sources of intergenerational correlations or from correlations in ability.

V.ii: Endogeneity of Education and Assets

The theoretical model and subsequent discussion on the empirical specification point out clearly that the level of education observed in the second period (t_1) can not be taken as exogenous in the non-farm participation regression due to the fact that the optimal education decision depends on the expected labor market opportunities. Likewise, current levels of assets of a household are determined by income and hence occupations of its members and can not be treated as exogenous. As mentioned before, to deal with the potential endogeneity problems, we utilize the Two Stage Conditional Maximum Likelihood Estimation (TSCMLE). At the first stage of the TSCMLE, the suspected endogenous variables are separately regressed on all exogenous variables

[27]The detail regression results are not reported in Table 3, but can be obtained from the authors.

in the regression model and a set of instruments. Given that we have two suspected endogenous variables (education, and assets), we also identify two sets of instruments. Following Card(2001), we instrumented education using village level average distance to nearest school, distance to school interacted with ethnicity dummies and with inherited agricultural land.[28] For asset ownership by the household, inherited agricultural land and its squared term are used as identifying instruments. The details of the first stage regression results are presented in the appendix Table A.2. The first stage regressions explain a considerable amount of the variations in education and assets while avoiding over-fitting. The adjusted R^2 is estimated to be 0.47 (for daughter's) and 0.49 (for son's) education equations respectively, 0.58 (for daughter's) and 0.56 (for son's) regressions for assets. Consistent with the findings of Card(1995), Conneely and Uusitalo (1997) and Maluccio (1998), both son's and daughter's education vary inversely with distance to nearest school (p-value =0.0). While distance to school interacted with inherited land appears to have no significant influence on the level of education of either sons or daughters, distance to school interacted with ethnicity is statistically significant in explaining son's education level. Consistent with the expectation, inherited land and its squared terms are highly statistically significant in explaining household's current level of assets in both son's and daughter's samples (p-value=0.0 in both cases). The estimated coefficients imply a concave relationship between asset ownership and inherited land for both sons and daughters. The two sets of instruments are separately and jointly highly statistically significant in the relevant regressions. The parental employment status variables are not statistically significant in education (for both sons and daughters) or asset equations for daughters. Parent's non-farm participation appears to have negative influence on the level of assets owned by the household only in the son's sample.

For the second stage regression, the set of explanatory variables (including the suspected endogenous variables) is augmented with the residuals from the first stage and then probit regression of non-farm participation is run on this augmented set of explanatory variables. A nice feature of the TSCMLE is that the t-statistic on the residual is a valid test of the null hypothesis that the suspected endogenous variable is in fact exogenous. The estimated coefficients of the first

[28] While ethnicity dummies are already in the structural equation, if educational attainment varies with ethnicity, then ethnicity interacted with distance to school still qualify as strong instruments. For detail, please see Card (1995).

stage residuals and their respective t-statistics are reported in the second panel of Table 3. In addition to the usual test based on t-statistics, we also carried out F tests of joint significance of the residuals from the first stage regressions, results of which are reported in the last panel of Table 3. An important advantage of TSCMLE is that even when the null hypothesis of exogeneity is rejected, the estimated coefficients are consistent, although the standard errors and t-statistics have to be corrected for the fact that first stage residuals are added as regressors in the second stage. All t-statistics TSCMLE estimates reported in Table 3 are corrected for two-stage nature of regressions as well as for intra-cluster correlations due to clustered sampling.

The results from second stage regressions for daughter's and son's samples are presented in columns 2a-2b and 4a-4b respectively (Table 3). In the son's sample, as speculated by the theoretical model, both education and household's level of asset ownership are endogenous to son's non-farm participation decision. The absolute t-statistics on first stage residuals are 2.48 and 3.16 respectively for education and asset residuals in column 4a and 2.56 (education) and 3.21 (assets) in column 4b. The F-tests on the joint significance of residuals from first stage regressions on education and assets also confirm that the null hypothesis of exogeneity of education and assets can be rejected resoundingly at p-value=0.004 or less in both 4a and 4b. However, we get strikingly different results for the daughter's sample as reported in columns 2a and 2b of Table 3. The t-statistics on residuals from education and asset equations indicate that none of the coefficients of residuals are statistically significant at even 10 percent level. Indeed, the null hypothesis of joint exogeneity of education and assets for daughters sample can be rejected only at p-value=0.32 or higher. The results suggest that problems of endogeneity of education and assets are not serious in the daughter's sample. As discussed earlier, the exogeneity of education is not entirely unexpected in a traditional society such as Nepal where investments in daughter's education depend largely on marriage market considerations instead of expected labor market returns.[29] The exogeneity of assets may reflect the low level of participation by women in better paid non-farm jobs, as it implies that women's income on average do not have significant impact on household's asset accumulation.

As to the regression results presented in the upper panel of Table 3, the strength of the

[29]For similar evidence from India, see Behrman, Foster, Rosenzweig and Vishishtha (1999).

intergenerational correlations remains undiminished in the daughter's sample even after assuming that education and assets are endogenous to non-farm participation decision (columns 2a & 2b). As before, having either (n^e) or both (n^b) parents employed in the non-farm sector increases daughter's probability of non-farm participation significantly. However, having only mother (n^m) in the non-farm sector has the strongest effect while only father (n^f) has no appreciable influence on daughter's probability of non-farm participation. The estimated marginal effects are only slightly smaller compared with the estimates in columns 1a and 1b. Even if we focus on the most conservative estimates (columns 2a & 2b), the intergenerational correlations in the case of daughter remains quite substantial. For instance, switching the indicator variable representing either parents employed in non-farm sector from zero to one raises daughter's probability of participation in non-farm sector from 0.15 to 0.24, providing an estimated marginal effect of 0.09. This represents nearly 63 percent increase in daughter's probability of being employed in non-farm sector if either parent was employed in the same sector. The effect of mother's non-farm participation (n^m) on daughter's probability is stronger still: it raises daughter's probability of being in non-farm employment by 203 percent. If both parents were employed in non-farm sector (n^b), it increases daughter's probability by 169 percent. These estimates suggest that intergenerational correlations in employment choice is rather dramatic for daughters. Indeed, only the level of education has an impact on non-farm participation stronger than those observed for either both parents in non-farm sector (n^b) or only mother in non-farm sector (n^m).[30]

In contrast with the results for daughters, the moderate positive correlations observed between parents and sons (columns 3a and 3b) turn out to be non-robust once the endogeneity of education and assets are recognized. When endogeneity of education and assets is properly accounted for, the TSCMLE results show that the estimated coefficients have expected positive signs (4a and 4b), but their magnitudes decline considerably and they are not statistically significant, separately or jointly.[31] The results from exogeneity tests indicate that expected occupation plays an important

[30]The level of education has a marginal effect of 0.29 on daughter's probability of non-farm participation. This result might seem counterintuitive given that education for girls is not geared to labor markets. However, there is no contradiction here. The result only shows that once a daughter gets education the probability that she will choose employment and actually be employed in the non-farm sector is much higher, whatever the original purpose of education might be.

[31]Endogeneity correction greatly enhances the impact of education on non-farm participation; the marginal effect of education on non-farm participation probability increases from 0.03 (in 3a & 3b ignoring endogeneity problem) to 0.20 (in 4a & 4b with proper correction for endogeneity).

role in the decision to invest in education in the case of sons and son's incomes from non-farm sources are also important in household's asset accumulation. When endogeneity of education and assets are accounted for, parent's non-farm participation does not appear to influence son's probability of participation in the non-farm sector significantly.[32]

The results thus indicate strong intergenerational linkages between mother and daughter, but the absence of any significant linkages between fathers and sons appears to be puzzling, especially given contrary evidence in the context of developed countries. However, our results are not inconsistent with the existing literature; we also find relatively larger and more significant linkages for sons when education and assets are assumed to be exogenous. Thus, at least a part of the weaker intergenerational correlations in occupational choice for sons seems to have resulted from the correction of endogeneity. Another possibility is that the non-farm sector, as broadly defined as in this paper, consists of a myriad of activities from unskilled to highly skilled occupations, and predominance of lower end and temporary jobs requiring little skill may have blurred the intergenerational linkages often reported for more skilled jobs in the context of developed countries. We explore the role of skill composition more thoroughly in the following section.

V.iii: Skill and Intergenerational Linkages

We define an indicator variable depicting if an individual is employed in jobs requiring specialized skills or not.[33] Similar indicator variables are also defined depicting if parents were employed in skilled occupations. Since many of the parents did not report finer occupational details, the regressions were run on a much smaller sample of sons (827 observations) and daughters (494 observations) for whom we have complete information. The results are reported in Table 4, columns 1a-2b for daughters and 3a-4b for sons. The regressions for the daughters' sample excluded the village dummies as only 23 villages have more than one women employed in skilled jobs (total observation: 67). Instead we use 'share of non-farm employment in total village level employ-

[32] As an additional robustness check, we drop those individuals who reported multiple occupations (both in agriculture and non-agriculture), and run regressions similar to 4a and 4b (Table 3), we find results nearly indistinguishable from those reported in Table 3.

[33] An individual is assumed to be employed in a skilled job if she/he reported any of the following occupations; professional and technical workers, administrative and managerial workers, clerical workers and operators, skilled sales and services workers, skilled workers in agriculture, production workers requiring specialized skills (e.g. machine operator, metal processors etc.).

ment' as a proxy for the common labor market opportunities faced by parents and daughters.[34] The qualitative results for daughters remain unchanged from those reported in Table 3. Parents, particularly mothers, exert great influence on daughters occupational choice. The marginal effects are similar in magnitude compared with those reported in Table 3 (1a-2b). However, the sample probability of daughter's participation in skilled jobs is nearly half (0.13) of that in non-agriculture as a whole (0.22). When expressed in percentage terms, the impact of parent's participation in skilled jobs on that of daughters is simply spectacular. For instance, compared with the situation when none of the parents were employed on skilled jobs, either parent's participation in skilled jobs raises daughter's probability of having a skilled job by 650 percent. Having only mother in skilled jobs increases daughter's probability by 1200 percent. Having both parents in skilled jobs has yet stronger effect; it raises daughter's probability by 1400 percent. The intergenerational positive correlations are thus much stronger in the case of skilled jobs for daughters.[35]

[See Table 4]

Consistent with our findings for daughters, the intergenerational correlations are stronger in skilled jobs in the case of sons too. The overall results for sons represent an improvement over that reported in Table 3 (columns 3a-4b). When endogeneity of education and assets are ignored, we find significant and positive impact of father's participation in skilled occupations on the probability of sons participation in similar jobs. Compared with the results for all non-farm jobs, the marginal effects are much larger in magnitude; having both parents or only father in skilled jobs improves son's probability by 0.28 and 0.21 respectively. Since the null hypothesis of exogeneity of education and assets can be rejected at 20 percent significance level, the appropriate TSCMLE estimates (4a and 4b) show that parental influence on sons' occupational choice is only slightly weaker. Both 'either parents in skilled jobs' (column 4a) and 'only father in skilled jobs'

[34]The comparison of results using share of non-farm employment in total village level employment as an explanatory variable with that of the case when village level dummies are included shows that the differences between these two sets of estimates are small in the overall daughter's sample (farm vs non-farm choice). For instance, the implied marginal effects of either parents in non-agriculture is 0.07 compared with 0.10 in column 2a of Table 3 (TSMLE estimates). Results for other specifications (2b, Table 3) are also similar. This suggests that the share of non-agriculture in total village level employment, is also a good proxy for labor market opportunities.

[35]In addition to the choice of skilled vs. unskilled jobs, we also experimented with different sub-samples of daughters to check robustness of the linkages. For instance, when we consider the sample of only married women, the intergenerational correlations are found to be slightly stronger. Given the tradition of women leaving their natal family upon marriage and joining spouse's households, the sample of married women can correct for any unobserved household level factors common to both parents and children residing in the same household.

(column 4b) are statistically significant at 5 percent or less. The estimated coefficients bear correct signs and are also large in magnitude. The implied marginal effects are also large; having a father in skilled job raises son's probability by 0.21, which represents nearly a 97 percent increase in probability over the case when father was employed in unskilled job. Having either parents employed in skilled jobs has effect similar in magnitude on son's probability of being employed in non-farm jobs. The results in Table 4 thus suggest that there are positive intergenerational correlations in occupations even in the sons' sample and that these correlations run along gender lines as observed in the case of daughters' in non-farm participation decisions.

To summarize, intergenerational correlations in occupation choice seem to be stronger in the case of skilled jobs for both sons and daughters. As in the case of non-farm occupations including both skilled and unskilled jobs, the correlations run along gender line but are much stronger for daughters. Though the regressions control for ability correlations using father, mother and spouse's education as explanatory variables, one may still argue that these are imprecise measures of ability. However, if the intergenerational correlations uncovered in the previous sections were primarily driven by the correlations in ability of the parents and children, then one would expect similar magnitudes of correlations for children of different gender. The huge differences in the strength of these correlations between sons and daughters suggest that intergenerational correlations observed in our data are not primarily due to correlations of parents and children's ability. The results point more to the 'role model' effects and learning externalities as a sources of these correlations. Women in a traditional society, being brought up within the confines of a household, have their mother as their primary role model with the effect that mothers have disproportionate influence on daughter's occupation choice. For sons, the set of role models can extend well beyond the household, and while father exerts some influence, father's impact on sons occupation choice becomes diluted as education opens up a richer menu of occupational choices to them.

VI: Conclusions

Despite the recent surge in interests in the determinants of non-farm participation in developing countries, the issue of intergenerational linkages in non-farm participation has, to our knowledge, not been addressed in the literature. A burgeoning literature on socioeconomic mobility, on

the other hand, emphasizes these intergenerational correlations. However, the empirical research in this literature has focused mostly on intergenerational income correlations in the context of developed countries.[36] In this paper, we present some first empirical evidence on intergenerational occupational correlations in non-farm participation in a developing country, Nepal.

The empirical results show that there are strong intergenerational correlations, especially for daughters, in non-farm participation arising from 'intangible' factors like role model effects, learning externalities, and transfer of reputation capital. The results of Two Stage Conditional Maximum Likelihood analysis that correct for potential enodgeneity of education and assets in the regressions, suggest dramatic impact of a mother's employment status on daughters' non-farm participation rate. The probability of a daughter's non-farm participation increases by 200 percent if mother is employed in the non-farm sector, even after controlling for a large number of relevant variables including education, assets, and non-farm opportunities. The linkage between mother and daughter is especially strong in case of skilled non-farm jobs, thus implying very restricted occupational mobility for women out of agriculture and low skilled non-farm activities. In contrast, the intergenerational link between father and son is found to be nonexistent, except for the case of skilled non-farm jobs. The difference in the strength of intergenerational correlations between son-father and daughter-mother implies that the observed correlations in case of mothers and daughters are not primarily due to intergenerational correlations in genetic ability or taste. Other intangible factors such as role model effects and learning externalities are perhaps more important in determining these correlations. The much stronger and positive intergenerational correlations between mothers and daughters also suggest the existence of a strong gender bias against women in occupational mobility. Such robust occupational correlations, on the other hand, provide a strong argument in favor of policy interventions for promoting non-farm participation of women due to the dynamic multiplier effect. It will be interesting to see if the pattern of intergenerational linkages found in case of Nepal is valid for other developing countries, especially in South Asia and Africa where the initial non-farm participation rates are strongly skewed against women.

[36]Solon (1999) in his survey of studies on intergenerational mobility cited only one paper on income mobility in the context of developing countries; the paper cited being Lillard and Kilburn (1995) that uses data from Malaysia.

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Table 1: Probability of Participation in Agriculture and Non-Agriculture

	Father in		Mother in		Unconditional
	Agriculture	Non-agriculture	Agriculture	Non-agriculture	
Daughters					
Agriculture	0.93	0.79	0.93	0.61	0.91
Standard Deviation	0.25	0.40	0.26	0.49	0.29
Non-agriculture	0.19	0.33	0.19	0.59	0.22
Standard Deviation	0.39	0.47	0.39	0.49	0.41
No. of observations	1750	403	1927	162	2060
Sons					
Agriculture	0.91	0.76	0.90	0.65	0.88
Standard Deviation	0.29	0.43	0.30	0.48	0.32
Non-agriculture	0.42	0.59	0.43	0.68	0.45
Standard Deviation	0.49	0.49	0.5	0.47	0.50
No. of observations	2619	613	2781	229	2948

Table 2: Intergenerational Correlation and Employment in the Non-Farm Sector

	Daughters						Sons					
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)
Either parent in non-agriculture (n^e)	0.41		0.38		0.44		0.37		0.19		0.24	
	(3.97)		(3.49)		(3.67)		(5.24)		(2.17)		(2.92)	
	[0.11]		[0.10]		[0.10]		[0.15]		[0.07]		[0.09]	
Both parents in non-agriculture (n^b)		1.05		0.95		0.97		0.65		0.48		0.44
		(6.35)		(4.68)		(4.75)		(4.84)		(2.67)		(2.58)
		[0.36]		[0.30]		[0.28]		[0.25]		[0.18]		[0.17]
Only father in non-agriculture (n^f)		-0.05		-0.05		0.003		0.29		0.12		0.18
		(-0.43)		(-0.33)		(0.02)		(3.52)		(1.10)		(1.84)
		[-0.01]		[-0.01]		[0.001]		[0.12]		[0.05]		[0.07]
Only mother in non-agriculture (n^m)		1.13		1.10		1.18		0.11		-0.05		0.13
		(3.42)		(3.02)		(3.21)		(0.48)		(-0.02)		(0.37)
		[0.39]		[0.36]		[0.37]		[0.04]		[-0.02]		[0.05]
Village Fixed effect	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Human, physical, network capital & household characteristics	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
No of observations	2060	2060	2060	2060	2060	2060	2948	2948	2948	2948	2948	2948
Sample probability	0.22	0.22	0.22	0.22	0.22	0.22	0.45	0.45	0.45	0.45	0.45	0.45

Note.- Entries are probit coefficients. Standard errors are corrected for intra-cluster correlations due to clustered sampling.

t-values are in parentheses and marginal effect of each variable (evaluated at sample means) is shown in bracket. All regressions include an intercept term.

Table 3: Intergenerational Correlation, Gender and Employment in the Non-Farm Sector

	Daughters				Sons			
	Probit		TSCMLE		Probit		TSCMLE	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Either parent in non-agriculture (n^e)	0.45		0.43		0.24		0.15	
	(3.52)		(2.94)		(2.84)		(1.00)	
	[0.10]		[0.09]		[0.09]		[0.05]	
Both parents in non-agriculture (n^b)		0.99		0.97		0.41		0.33
		(4.79)		(3.92)		(2.39)		(1.02)
		[0.29]		[0.25]		[0.16]		[0.11]
Only father in non-agriculture (n^f)		-0.01		-0.03		0.18		0.1
		(-0.05)		(-0.16)		(1.86)		(0.74)
		[-0.002]		[-0.01]		[0.07]		[0.03]
Only mother in non-agriculture (n^m)		1.18		1.16		0.12		0.01
		(3.16)		(2.12)		(0.04)		(0.03)
		[0.37]		[0.32]		[0.05]		[0.01]
Abiliity Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimates from second stage regression								
Residual (education)			-1.1	-1.09			-0.5	-0.52
			(-1.34)	(-1.38)			(-2.48)	(-2.56)
Residual (assets)			0.11	0.11			0.33	0.32
			(1.04)	(1.04)			(3.16)	(3.21)
Test of Exogeneity								
F(H_0: Education & Assets Exogenous)			1.13	1.14			5.63	5.84
p-value			0.33	0.32			0.004	0.003

Note.- Entries are probit coefficients for Reg 1 and 3 (a&b), for the rest, entries are Two-stage conditional maximum likelihood coefficients. Standard errors are corrected for two stage regressions and for arbitrary heteroskedasticity due to clustered sampling. t-values are in parentheses and marginal effect of each variable (evaluated at sample means) are shown in brackets. All regressions include parental employment dummies, log of levels of education, age, age squared, dummy for married, household size & composition, assets, distance to bank, un-earned income, control for ability, dummy for migrant members, 14 ethnicity dummies, a number of village level dummies, and an intercept term.

Table 4: Intergenerational Correlation in skilled jobs

	Daughters				Sons			
	Probit		TSCMLE		Probit		TSCMLE	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Either parent in skilled jobs	0.94		0.96		0.62		0.64	
	(3.45)		(3.30)		(2.65)		(2.47)	
	[0.09]		[0.10]		[0.21]		[0.20]	
Both parents in skilled jobs		1.56		1.63		0.77		0.70
		(3.76)		(3.77)		(1.72)		(1.40)
		[0.30]		[0.32]		[0.28]		[0.24]
Only father in skilled job		0.25		0.23		0.61		0.64
		(0.69)		(0.60)		(2.42)		(2.28)
		[0.02]		[0.02]		[0.21]		[0.21]
Only mother in skilled job		1.47		1.53		0.50		0.48
		(3.07)		(3.42)		(0.81)		(0.70)
		[0.28]		[0.29]		[0.18]		[0.16]
Test of Exogeneity								
$F(H_0$: Education & Assets Exogenous)			0.06	0.73			1.77	1.72
p-value			0.94	0.48			0.17	0.18
Number of observations	494	494	494	494	827	827	827	827
Sample probability	0.13	0.13	0.13	0.13	0.33	0.33	0.33	0.33

Note.- Entries are probit coefficients for Reg 1 and 3 (a&b), for the rest, entries are Two-stage conditional maximum likelihood coefficients. Standard errors are corrected for two stage regressions and for arbitrary heteroskedasticity due to clustered sampling. t-values are in parentheses and marginal effect of each variable (evaluated at sample means) are shown in brackets. All regressions include parental employment dummies, log of levels of education, age, age squared, dummy for married, household size & composition, assets, distance to bank, un-earned income, ability controls, dummy for migrant members, ethnicity dummies, a number of village level dummies (for sons' sample only), and an intercept term. Regressions for daughters include share of non-farm employment in total village level employment.

Table A.1: Summary Statistics

	Daughters		Sons	
	Mean	Standard Deviation	Mean	Standard Deviation
Participation rate in non-agriculture	0.22	0.41	0.45	0.50
Either parent in non-agriculture	0.21	0.41	0.23	0.42
Both parents in non-agriculture	0.07	0.25	0.06	0.24
Only father in non-agriculture	0.13	0.34	0.15	0.35
Only mother in non-agriculture	0.01	0.12	0.02	0.13
Level of Education (Years)				
Children	1.76	3.74	4.29	4.82
Father	1.14	2.82	1.19	2.92
Mother	0.14	1.02	0.08	0.77
Spouse	2.45	4.19	0.43	1.90
Age	33.5	13.1	35.7	14.8
Age squared	1294	995	1492	1158
Married	0.79	0.41	0.76	0.43
Household size	6.52	3.23	6.57	3.09
Share of adult female	0.28	0.15	0.23	0.11
Share of children	0.15	0.15	0.15	0.14
Share of Young	0.33	0.21	0.34	0.20
Share of Old	0.03	0.09	0.02	0.07
Travel time to nearest School	0.36	0.37	0.39	0.34
Travel time to nearest bank	2.57	3.68	2.89	3.94
Un-earned income (million Rs)	0.01	0.08	0.01	0.08
Asset (million Rs.)	0.59	1.05	0.49	1.38
Inherited land (value in million Rs.)	0.30	1.09	0.23	0.92
Inherited land squared (value in million Rs.)	1.29	11.45	0.89	9.78
Migrant in the household	0.38	0.48	0.35	0.48

Table A.2: First Stage Regressions

Dependent variable	Daughters				Sons			
	Education		Asset		Education		Asset	
	β	t	β	t	β	t	β	t
Age	-0.07	-8.09	0.00	0.18	-0.04	-3.99	0.002	0.12
Age squared	0.001	6.31	0.00	0.20	0.00	1.10	4E-05	0.23
Married	-0.18	-3.23	0.01	0.84	0.15	2.73	0.008	0.12
log(household size)	0.11	2.71	0.91	10.93	0.19	3.39	1.06	11.73
Share of adult female	0.30	1.48	0.29	0.76	0.03	0.12	0.26	0.53
Share of children	-0.26	-1.27	-1.06	-2.75	-0.29	-1.59	-1.56	-4.43
Share of Young	-0.10	-0.66	-0.79	-2.41	-0.21	-1.31	-0.81	-2.54
Share of Old	0.08	0.41	0.52	1.31	0.58	2.03	-0.23	-0.54
Travel time to nearest bank	-0.01	-1.29	-0.01	-0.41	0.00	-0.04	-0.01	-0.83
Un-earned income (million Rs)	0.42	1.66	4.20	6.03	0.44	0.84	5.46	9.69
Migrant in the household	0.08	2.46	-0.16	-2.04	0.03	0.67	-0.15	-2.05
Father's education								
Literate	0.26	3.58	0.45	5.58	0.56	9.72	0.53	6.33
Primary Education	0.43	5.62	0.24	2.07	0.52	6.04	0.3	3.19
Secondary education	0.69	5.01	0.36	2.32	0.63	6.74	0.78	5.32
Higher than Secondary Education	0.80	3.48	0.57	2.80	0.32	2.21	0.72	4.07
Mother's education								
Literate	-0.09	-0.41	-0.80	-3.23	0.08	0.56	0.22	1.42
Primary Education	0.43	1.91	0.48	2.05	0.31	1.51	1.06	3.16
Higher than Primary Education	0.42	1.27	0.87	2.18	0.20	1.22	0.28	0.75
Log(education of spouse/head)	0.10	4.45	0.18	4.53	0.23	6.21	0.23	4.96
Either parent in non-agriculture	0.02	0.33	-0.02	-0.20	-0.14	-1.09	-0.18	-2.46
Instruments								
Av. travel time to school (TSCH)	-0.26	-2.91	-0.27	-2.19	-0.28	-5.71	0.16	1.57
Inherited land (value in million Rs.)	0.09	1.18	1.17	7.00	0.13	1.43	1.29	9.01
Inherited land squared (million Rs.)	-0.01	-1.15	-0.07	-4.71	-0.01	-2.92	-0.08	-5.36
TSCH*inherited land	-0.17	-0.92	-0.02	-0.04	0.28	1.32	0.01	0.03
Signicance of instruments	F-test	P-value	F-test	P-value	F-test	P-value	F-test	P-value
TSCH*ethincity dummies	1.47	0.13	9.57	0.00	1.83	0.03	3.55	0
All TSCH related instruments	1.9	0.02	10.69	0	7.44	0	3.25	0
Inherited land & its squared	0.72	0.49	25.25	0	7.15	0	48.48	0
R^2	0.47		0.58			0.49		0.56
No. of observations	2060		2060			2948		2948

Note: All regressions include 14 ethnicity dummies. Regressions for daughters include 150 village dummies and that for sons include 241 village dummies. Standard errors are corrected for intra-cluster correlations

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